introducing fresh water to form a suspension containing cellulosic fibres, and optional fillers, to be dewatered, wherein the amount of fresh water introduced is less than 20 tons per ton of dry paper produced.

A4

23. (New) The process of claim 22, wherein less than 10 tons of fresh water is introduced per ton of dry paper produced.- -

REMARKS

The present response amends claims 1, 16 and 18, adds new claims 21-23, cancels claim 14 without prejudice and requests reconsideration of the rejected claims. A Marked Version of the amendments is attached.

Claim 1 is amended to incorporate the recitations of cancelled claim 14 and to recite the amount of cationic organic polymer disclosed on page 13, ll. 15-17, of the specification. Support for new claim 21 can be found on page 14, ll. 22-24, of the specification. Support for new claim 22 can be found in original claims 1 and 16. Support for new claim 23 can be found in original claim 17.

Claims 1 to 17 are rejected under 35 U.S.C. 112, 2nd paragraph, as being indefinite. For a person of ordinary skill in the art it is clear that the invention can be carried out in the scope of claim 1 since the amount of added cationic organic polymer would not have any influence on the conductivity. Therefore, it is of no importance to the measurement of the conductivity if it is measured before or after the addition.

Claims 1 to 20 are rejected under 35 U.S.C. 102(a) as anticipated by Nagarajan et al. (EP-A-0 805 234) further evidenced by Satterfield et al. (US 5,755,930). This rejection is respectfully traversed.

Novelty

Nagarajan et al. relates to a papermaking process comprising adding to an aqueous cellulosic papermaking slurry a dispersion polymer and microparticles. The papermaking process of Nagarajan et al. is applicable for use on all types of pulps, see page 3 lines 41 to 45, and is best suited for use on chemical pulps. Nagarajan et al. does not mention conductivity nor any problems involved with high conductive stocks and Nagarajan et al. is silent about any suspensions having a content of di- and multivalent cations of at least 200 ppm. Thus, the invention according to claims 1 to 17 is not anticipated by Nagarajan et al.

Satterfield et al. discloses "one analytical technique for indicating preferred "dirty" suspensions is by measuring conductivity, since such suspensions tend to contain ionic trash and other electrolyte" emphasis added. There is no mention of suspensions having a content of di- and multivalent cations of at least 200 ppm.

In example 7, 3320 ppm of Na^+ was needed to adjust the conductivity to 10 mS/cm, however, in example 8, 1400 ppm Zn^{2+} was needed to obtain a conductivity of 4.5 mS/cm. Although, the amount of charge is similar in example 7 compared to example 8 with respect to univalent and multivalent ions, 1400 ppm Zn^{2+} equalling 1400 x 2 = 2800 ppm Na^+, the needed conductivity is less than half of the conductivity in example 7 (4.5 mS/cm versus 10 mS/cm). Hence, there does not exist a relationship between the conductivity on the one hand and the amount of univalent and multivalent ions.

Thus, the invention according to claims 1 to 17 is not anticipated by Satterfield et al.

Neither Nagarajan et al. nor Satterfield et al. discloses or hints recirculating white water and introducing fresh water to form a suspension containing cellulosic

fibres, and optional fillers, to be dewatered, wherein the amount of fresh water introduced is less than 30 tons per ton of dry paper produced. Therefore, the invention according to claims 18 to 20, 22 and 23 is not anticipated by Nagarajan et al. or evidenced by Satterfield et al.

Inventive step

In the examples of Nagarajan et al., salt dispersion polymers A (DMAEA.BCQ (BCQ = benzyl chloride quaternary salt); 10 mole %), B (DMAEA.MCQ (MCQ = methyl chloride quaternary salt); 10 mole %) and C (DMAEA.MCQ; 20 mole %) were tested against a latex polymer D (DMAEA.MCQ; 10 mole %). The examples of Nagarajan et al. do not show any advantages of polymers vis-à-vis stocks of different conductivity, because the polymers A to D were evaluated on test stocks together with and without microparticles. In addition, with regard to the salt dispersion polymers A and B, it can be seen from Table I and II of Nagarajan et al. that salt dispersion polymer A having a benzyl group had poorer retention performance than salt dispersion polymer B, which has a methyl group instead of an aromatic group. When salt dispersion polymers A and B were tested without addition of microparticles, the turbidity was 289 FTU for polymer A and 252 FTU for polymer B. Thus, polymer B showed improved retention compared to polymer A. When salt dispersion polymers A and B were tested with addition of microparticles the result was the same, poorer retention performance for polymer A compared to the retention performance for polymer B, i.e. 84 FTU for polymer A compared to 74 FTU for polymer B.

Thus, the teachings of Nagarajan et al. is that a cationic polymer having a non-aromatic group has better retention performance than a cationic polymer having an aromatic group. Accordingly, Nagarajan et al. recommends the skilled person to add to a suspension a cationic polymer having methyl groups rather than aromatic groups.

The results of examples 3 to 8 of the present application show, contrary to teachings of the examples of Nagarajan et al. that cationic polymer having an aromatic group improves the drainage and retention performance on high conductive stocks (conductivity levels 2.4, 5.5, 7.0 and 10.0 mS/cm) compared to cationic polymer having a methyl group. Taking account of the teachings of Nagarajan et al., it is very surprising that the addition of an organic polymer having an aromatic group gives significantly improved results in respect to drainage and retention over addition of a non-aromatic substituted cationic polymer. Therefore, a person skilled in the art trying to improve the drainage and retention aid of suspensions would certainly not chose an aromatic substituted cationic polymer, but rather a non-aromatic substituted cationic polymer. Therefore, the invention according to claims 1 to 17 is not obvious over Nagarajan et al.

Satterfield et al. discloses anionic polymers having aromatic groups i.e. formaldehyde resin, see column 7, line 39 to column 8, line 67. The preferred aromatic formaldehyde resin is a phenolsulphonic-formaldehyde resin, i.e. an anionic aromatic polymer, whereas the present invention discloses a cationic aromatic polymer. Hence, Satterfield et al. teaches away from the present invention. Therefore, the skilled person would not arrive at the present invention. Thus, the invention according to claims 1 to 17 is not obvious over Satterfield et al.

There is no allowable combination between Nagarajan et al. and Satterfield et al. that will arrive at the drainage and retention aid of the invention, which is utilised in a process for producing paper by forming and dewatering an obtained suspension on a wire, wherein the suspension that is dewatered on the wire has a conductivity of at least 2.0 mS/cm and has a content of di- and multivalent cations of at least 200 ppm, which aid comprises a cationic organic polymer having an aromatic group.

As mentioned above neither Nagarajan et al. nor Satterfield et al. discloses or hints recirculating white water and introducing fresh water to form a suspension

containing cellulosic fibres, and optional fillers, to be dewatered, wherein the amount of fresh water introduced is less than 30 tons per ton of dry paper produced.

Satterfield et al. teaches the utilisation of aromatic substituted anionic organic polymers in the production of paper and is therefore teaching away from the present invention. Therefore, the invention according to claims 18 to 20, 22 and 23 is non-obvious over Satterfield et al.

As mentioned before, Nagarajan et al. teaches that a cationic polymer having a non-aromatic group has better retention performance than a cationic polymer having an aromatic group. A person of ordinary skill in the art would have no incentive to look for a process in Nagarajan et al. in which process white water is recirculated together with an introduction of fresh water in an amount of less than 30 tons per ton of dry paper produced, since Nagarajan et al. teaches that a cationic polymer having a non-aromatic group has better retention performance than a cationic polymer having an aromatic group. Therefore, the invention according to claims 18 to 20, 22 and 23 is non-obvious over Nagarajan et al.

There is no incentive in Satterfield et al. for a person of ordinary skill in the art to look for a process in Nagarajan et al. in which process white water is recirculated together with an introduction of fresh water in an amount of less than 30 tons per ton of dry paper produced, since Satterfield et al teaches anionic organic polymers having aromatic groups, and by this is teaching away from the present invention of the pending application, and Nagarajan et al. does not mention introduction of fresh water in an amount less than 30 tons per ton of dry paper produced. Thus, the invention according to claims 18 to 20, 22 and 23 is non-obvious over Nagarajan et al. in view of Satterfield et al.

Claims 1 to 7, 11, and 13 to 20 are rejected under 35 U.S.C. 102(b) as anticipated by Pearson (US 5,466,338) further evidenced by Satterfield et al. (US 5,755,930). This rejection is respectfully traversed.

Novelty

As mentioned above Satterfield et al. discloses "one analytical technique for indicating preferred "dirty" suspensions is by measuring conductivity, since such suspensions tend to contain ionic trash and other electrolyte" emphasis added. Satterfield et al. does not disclose cationic polymers having an aromatic group, but discloses anionic polymers having aromatic groups i.e. formaldehyde resin, see column 7, line 39 to column 8, line 67, and Satterfield et al. does not disclose or hint recirculating white water together with introducing fresh water to form a suspension containing cellulosic fibres, and optional fillers, to be dewatered, wherein the amount of fresh water introduced is less than 30 tons per ton of dry paper produced. Thus, the claimed invention is not anticipated by Satterfield et al.

Pearson discloses treatment of re-pulped coated broke slurry with a water-soluble cationic polymer. Pearson does not disclose conductivity of cellulose fibre suspensions nor any problems involved with forming and dewatering of high conductive stocks and Pearson is silent about any suspensions having a content of di- and multivalent cations of at least 200 ppm. Thus, the invention according to claims 1 to 17 is not anticipated by Pearson or evidenced by Satterfield et al.

Pearson does not disclose or hint recirculating white water together with introduction of fresh water to form a suspension containing cellulosic fibres, and optional fillers, to be dewatered, wherein the amount of fresh water introduced is less than 30 tons per ton of dry paper produced. Thus, the invention according to claims 18 to 20, 22 and 23 is not anticipated by Pearson or evidenced by Satterfield et al.

Inventive step

Pearson discloses dispersion polymers useful for coagulating and retaining white pitch and does not mention anything about any suspensions having a content of di- and multivalent cations of at least 200 ppm nor recirculation of white water together with an introduction of fresh water in an amount less than 30 tons per ton of dry paper produced. Therefore, a skilled person has no reason to look for any process for production of paper in which process the dewatering of high conductive stocks is improved, since Pearson is silent about dewatering and also about high conductive suspensions. Thus, the invention according to the claims is non-obvious over Pearson.

There is no incentive in Satterfield et al. for a person of ordinary skill in the art to look for a process in Pearson, in which process white water is recirculated together with an introduction of fresh water in an amount of less than 30 tons per ton of dry paper produced, since Satterfield et al teaches anionic organic polymers having aromatic groups, and by this is teaching away from the present invention of the pending application, and Pearson does not mention introduction of fresh water in an amount less than 30 tons per ton of dry paper produced. Thus, the claimed invention is non-obvious over Pearson in view of Satterfield et al.

Respectfully submitted,

L. E. Parker

Lainie E. Parker
Attorney for Applicants
Registration No.: 36,123

Akzo Nobel Inc.
Intellectual Property Department
7 Livingstone Avenue
Dobbs Ferry, NY 10522-3408
(914) 674-5466

Encl. Marked Version

MARKED VERSION

IN THE CLAIMS:

Please amend the following claims and cancel claim 14 without prejudice.

1. (Amended) A process for the production of paper which comprises;
(i) providing a suspension containing cellulosic fibers, and optional fillers,
(ii) adding to said suspension a drainage and retention aid comprising 0.001% by weight of a cationic organic polymer based on dry stock substance, the cationic organic polymer having an aromatic group;
(iii) forming and dewatering the obtained suspension on a wire, wherein the suspension that is dewatered on the wire has a conductivity of at least 2.0 mS/cm, and a content of di- and multivalent cations of at least 200 ppm.

Claim 14 is deleted.

16. (Amended) The process of claim 1, further comprising obtaining a wet web of paper and white water from dewatering the suspension on the wire, recirculating white water and ~~optionally~~ introducing fresh water to form a suspension containing cellulosic fibers, and optional fillers, to be dewatered, wherein the amount of fresh water introduced is less than 20 tons per ton of dry paper produced.

18. (Amended) A process for the production of paper which comprises:
(i) providing a suspension containing cellulosic fibers, and optional fillers;
(ii) adding to said suspension a drainage and retention aid comprising a cationic organic polymer having an aromatic group;
(iii) forming and dewatering the obtained suspension on a wire to obtain a wet web of paper and white water,
(iv) recirculating white water and ~~optionally~~ introducing fresh water to form a suspension containing cellulosic fibers, and optional fillers, to be dewatered, wherein

the amount of fresh water introduced is less than 30 tons per ton of dry paper produced.

Please add the following new claims:

- -21. (New) The process of claim 1, wherein the suspension that is dewatered on the wire has a content of di- and multivalent cations of at least 300 ppm.

22. (New) A process for the production of paper which comprises;
(i) providing a suspension containing cellulosic fibres, and optional fillers,
(ii) adding to said suspension a drainage and retention aid comprising a cationic organic polymer having an aromatic group;
(iii) forming and dewatering the obtained suspension on a wire, wherein the suspension that is dewatered on the wire has a conductivity of at least 2.0 mS/cm and obtaining a wet web of paper and white water, recirculating white water and introducing fresh water to form a suspension containing cellulosic fibres, and optional fillers, to be dewatered, wherein the amount of fresh water introduced is less than 20 tons per ton of dry paper produced.

23. (New) The process of claim 22, wherein less than 10 tons of fresh water is introduced per ton of dry paper produced.- -